Skill 13.01 Problem 1

Draw Bohr models for the following atoms:

a. H, Li, Na
b. Be, Mg, Ca
c. C, Si, Ge
d. Ne, Ar, Kr

What does each group of atoms have in common?

Group I	H	Li	Na
Group II	Be	Mg	
Group IV	C	Si	
Group VIII	Ne	Ar	

Skill 13.02 Problem 1

a. For the n=2, main energy level,
   (i) How many sub-energy levels exist?

   (ii) What are their values?

b. For the n=3, main energy level,
   (i) How many sub-energy levels exist?

   (ii) What are their values?

c. For the n=5, main energy level,
   (i) How many sub-energy levels exist?

   (ii) What are their values?

Skill 13.02 Problem 2

a. What are the letter designations for the possible subshells on the n=2 main energy level?

b. What are the letter designations for the possible subshells on the n=3 main energy level?

Skill 13.03 Problem 1

How many orientations are possible for each sub-energy level?

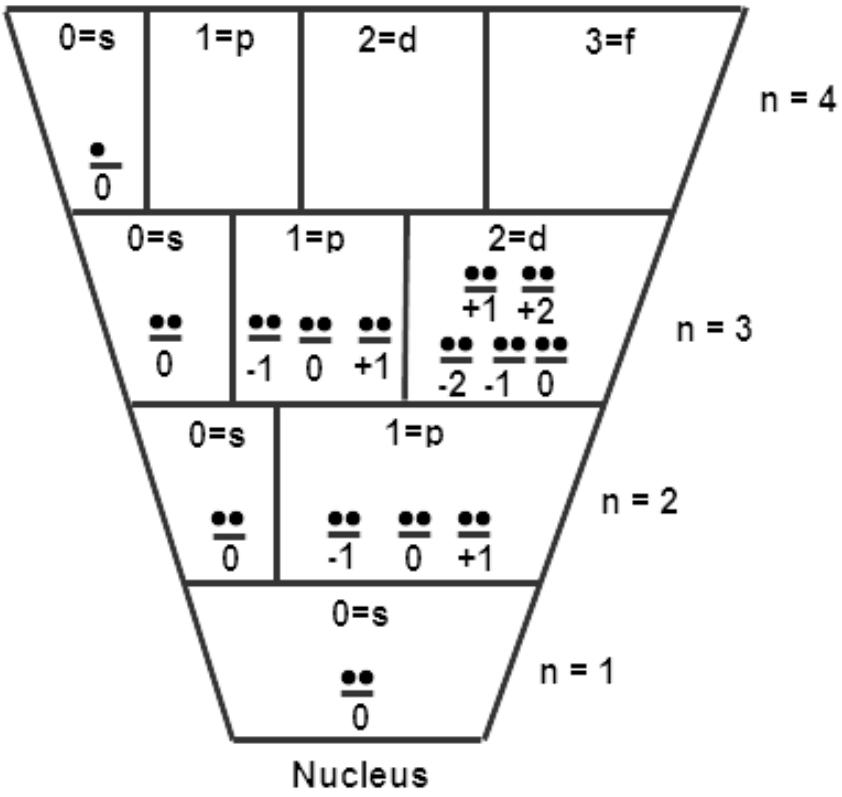
(a) l=s	(b) l=p	(c) l=d	(d) l=f

Skill 13.03 Problem 2

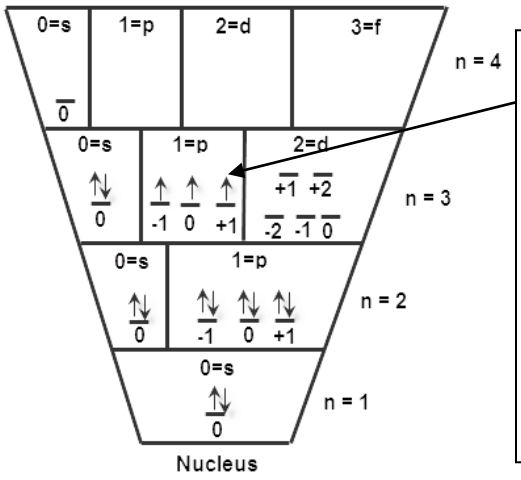
List the possible values of m_l for the l=f or l=3 sub-energy level.

Skill 13.03 Problem 3

Complete the *n*=4 main energy level. For each sub-energy level indicate the number of orientations (aka orbitals) with a "__". Write the corresponding number below.



Skill 13.04 Problem 1



This electron has the following values:

n=3; l=1; m_l=+1; m_s= +1/2

Or we can also write it using the following short hand notation.

(3, 1, +1, +1/2)

The values in the shorthand method correspond to the following quantum numbers,

(n, l, m_l, m_s)

Consider the atomic model of the atom shown above.

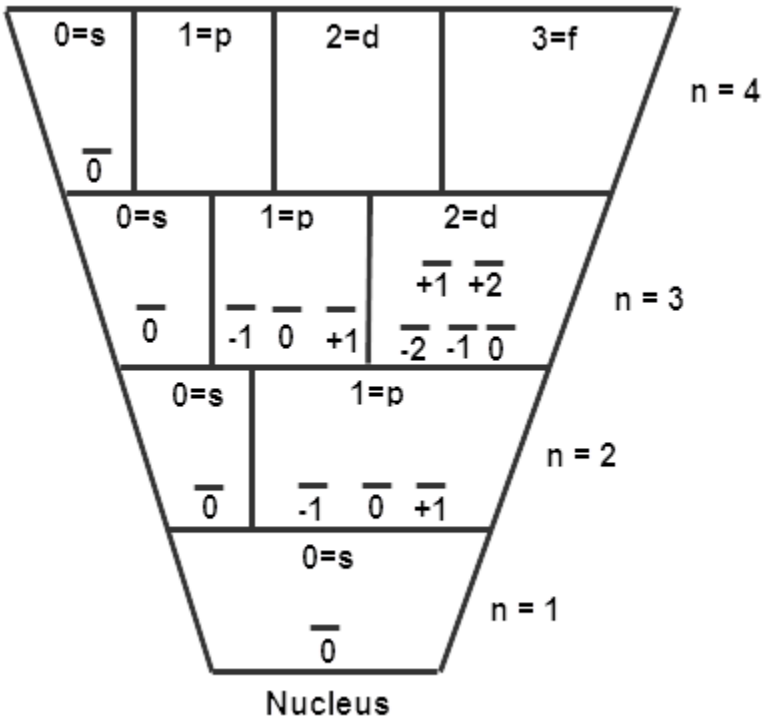
(a) How many electrons are in this atom?

(b) Assuming the atom is neutral, that is it has equal numbers of protons and electrons. What atom is represented by the diagram?

(c) What are the values of n, l, m_l, and m_s for each electron on the 3rd main energy level? List their values for each electron using the short hand method shown above.

Skill 13.05 Problem 1

(a) Show the filling of electrons for phosphorus in the diagram below.
(b) Predict whether phosphorus is paramagnetic or diamagnetic.



Skill 13.05 Problem 2

(a) Draw atomic diagrams for each of the following atoms.
(b) Predict whether each atom is paramagnetic or diamagnetic.

(a) Helium

(b) Nitrogen

(c) Chlorine
(d) Magnesium